# Selection on Attainment? Local Authorities, Pupil Backgrounds, Attainment and Grammar School Opportunities

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# Selection on Attainment?: Local Authorities, Pupil Backgrounds, Attainment and Grammar School Opportunities

This paper uses the National Pupil Database to explore how grammar school opportunities vary among pupil groups, and how grammar school opportunities correlate with the Local Authorities (LAs), pupil backgrounds and attainment. The results show that grammar school admission is relatively fair, based on its selection criterion, but there is no evidence that grammar schools can promote social mobility by providing more opportunities for disadvantaged pupils, which is the major claim supporting their expansion. Snapshots of grammar school opportunities in each LA, and the probability of attending grammar schools for four pupil subgroups are examined. Then logistic regression models controlling for pupil backgrounds and attainment are created. Findings reveal that the varied proportion of grammar school places in each LA leads to unbalanced grammar school opportunities between them, making the difficulty of attending grammar schools diverse. The difference in grammar school opportunities between LAs has benefited a group of pupils moving outside their home LAs for secondary education, usually from more advantaged families. In LAs selecting more than 20% of their pupils into grammar schools, pupils eligible for free school meals, pupils with special educational needs, native English speakers and white pupils are less likely to go to grammar schools, while those from richer areas, from minority ethnic groups and those younger within a year group have higher chances when controlled for prior attainment. The difference in grammar school opportunities between social groups is largely the stratification of early-age attainment, and is unlikely the result of deliberately biased selection process.

Keywords: grammar schools; equal education; selective admission; secondary schools; access to education; educational opportunities

## Introduction

The selection of young children based on early attainment and then the provision for different routes through schooling depending on the results is a long-established practice worldwide. Among the 72 participants in the Programme for International Student Assessment (PISA), 15 countries (e.g. Germany and Singapore) select their pupils before the age of 15. However, most Anglophone countries do not operate a national selection system during secondary education. Regardless, selective schools for pupils with certain characters still exist (e.g. grammar schools in England). Secondary education in England has a history of dividing pupils into different pathways according to their academic, religious or other personal characteristics. Dating back to the 1940s, grammar schools were an essential part of the Tripartite system which aims to divide pupils into different types of secondary schools based on their abilities. However, along with the shift to a comprehensive system, the number of grammar schools has decreased to fewer than 200. Currently, only 5% of English pupils attend grammar schools (Bolton 2017). Despite their limited numbers, grammar schools have achieved a disproportionate amount of political attention because of their sensitive link to equity and social mobility, key issues for England. As the current government claims to make Britain a place that "works for everyone, not just the privileged few" (Department for Education [DfE] 2016, 5), grammar schools' assumed role in serving pupils from less advantaged backgrounds to fulfil their potential has been constantly emphasised. This is because grammar schools select pupils on ability alone, rather than based on family backgrounds (such as the parents' ability to buy houses in the catchment area of good comprehensive schools, and to pay the cost of a private school education). However, the assumptions behind grammar schools' role in helping the poor need further examination.

This study explores how grammar school opportunities vary between pupil groups. It inquires how grammar school opportunities are related to the LAs where pupils apply for schools and to pupils' family backgrounds, in addition to attainment. While most previous research has grouped LAs and grammar schools together or has focused on only one LA, this study presents the pattern of each LA, as LAs with different proportions of grammar school pupils may not reasonably be categorised or analysed together. This study first presents how the difficulty and likelihood of being admitted to grammar schools varies across LAs. This will demonstrate to what extent entrance into grammar school is decided by where pupils live and where they apply for secondary schools. It will also address whether this has an influence on certain groups of pupils. Furthermore, the likelihood of four minority groups in each LA attending grammar schools is also revealed, both with and without the consideration of prior attainment. Besides patterns of individual LAs, this study also focuses on LAs where the proportion of grammar school pupils is over 20%. This was done to systematically elucidate the connection between pupil backgrounds, prior attainment and opportunities for grammar school participation.

**Grammar schools in England**

According to the 1944 Education Act, pupils with different levels of academic attainment in England should be divided into grammar schools, secondary modern schools and technical schools, among which grammar schools were the primary choice for those with the best performance (Kerckhoff et al. 1998). Based on the consensus from the 1940s to the mid-1960s that secondary education should be selective, the proportion of grammar school students continued growing and peaked at 38% in 1964 (Bolton 2017; Jesson 2013). However, starting in the 1950s, this selective system was

criticised on the grounds of segregation and inequality of early-age selection. In short, grammar schools were dominated by pupils from professional or managerial families, and they did not appear to lower the effects of socioeconomic status (SES) on pupil attainment (Power and Whitty 2015). As a result, grammar schools were gradually replaced by the alternative—comprehensive secondary schools, as stated by the Labour Government in 1964. Thus, the national secondary education system was converted into a non-selective system. Since the 1998 School Standards and Frameworks Act, the opening of new grammar schools has been prohibited, and the total number of grammar schools has settled at around 163.

Although the number of grammar schools has remained steady for several decades, there have been constant voices in support of their reintroduction, mostly from the Conservative Party and some parents (Morris and Perry 2017). In 2015, the approval of the first "new" grammar school in 50 years in Kent, the annexe of the Weald of Kent, aroused fierce public discussion. Although grammar schools can expand within a legal frame, being located 10 miles away from its main campus, this annexe was regarded as a new grammar school by some (Coughlan 2016). As an encouraging sign of the looser restrictions on grammar schools, it was reported that at least eight more regions were planning a similar expansion for their grammar schools (Espinoza, Finnigan, and Gurney-Read 2015). The debate was intensified by the new government led by Theresa May in 2016. As an important part of Theresa May's education reform, selective schools were encouraged to be more active in raising academic performance nationally. In a Green Paper in September 2016, *Schools That Work for Everyone* (DfE 2016), several ways of developing grammar schools at the national level were suggested. Existing selective schools would be allowed to expand and new ones could be established when parental demand for selection was demonstrated. Additionally, well-

performing non-selective schools could be converted into selective schools if they met the conditions for serving more disadvantaged pupils. Examples of these conditions would be accepting a proportion of underprivileged pupils, establishing a primary feeder in poorer areas and providing more opportunities to join the school at different ages (DfE 2016, 25). An additional statement supporting the proposal was published by the current government in February 2017, in which this new education system with more selective schools was believed to "increase parental choice, create more good schools and decrease the attainment gap between children from high and low socio-economic groups" (House of Commons 2017, 5). Although the attempt to lift the ban on grammar schools was suspended after the loss of a majority in parliament during the election of 2017 and the aforementioned Green Paper was thus abandoned, the intention to expand grammar schools has not gone away, as was claimed by the Conservative Government at the time of writing (Harding 2017). The whole back-and-forth process since the 1990s has confirmed the importance of grammar schools and their sensitive roles in England's education system. Furthermore, although only around 5% of pupils in England currently attend grammar schools, existing grammar schools can still expand to increase their enrolments nationally. Therefore, the dispute over grammar school selection needs more investigation.

## Rationales for and concerns on the grammar school policy

### *Effectiveness of grammar schools*

One of the major supporting claims of grammar schools is their high levels of achievement, as believed by some. Since some grammar schools have reputations dating back to the Middle Ages, the image of grammar schools is associated with academic and social success (Marten 2015). Confounded by government claims about the

effectiveness of grammar schools (Conservative Party 2017; DfE 2016), the long-standing mythology of their excellence obviates the need for hard evidence, especially for parents who are eager to send their children to them. However, most research has found that "the grammar school effect" is small. Based on the national Best 8 value-added score, the effect of grammar schools should be around one third to half a grade per subject (Morris and Perry 2017). However, it has also been pointed out that measurement error in baseline scores will systematically exacerbate the advantage of high-performing pupils. Thus, the observed effect of grammar schools based on value-added scores, which takes no account of school level attainment, is largely spurious (Harker and Tymms 2004; Perry 2018). Controlling for both personal and school level characteristics, Coe and his colleagues concluded that the effect ranged from zero to three-quarters of a grade per subject. However, they were unwilling to regard this as a real grammar school effect, as pupils in grammar schools had already been making more progress while attending primary schools (Coe et al. 2008, 235). A similar conclusion was made by Gorard and Siddiqui (2018) that based on the result from multistage regression models controlling for pupil level characteristics and school level segregation of free school meals (FSM) eligibility, grammar schools appear to have no difference to other schools in effectiveness.

***Social mobility, equity and integration***

The concerns on social mobility are always a crucial issue, as the link between background and life destiny is strong in Britain (Social Mobility Commission 2017). Therefore, another important reason behind the grammar school policy is the perceived roles of grammar schools in sustaining meritocracy and promoting social mobility by providing fair chances for all pupils. While the secondary education system in England

is largely comprehensive, indirect selection based on pupils' family backgrounds still exists. This is realised mostly via housing affordability as parents need to pay £45,700 more than the average price to buy a house in the catchment area of a top comprehensive school (Cullinane et al. 2017). Good comprehensive schools are accepting many fewer FSM pupils than their fair share, and the rate is only 9.4% among the top 500 comprehensive schools. Unlike the admission principle of comprehensive schools, the selection of grammar schools is based solely on pupils' ability. Therefore, grammar schools are believed to have the potential to provide social ladders for children from lower SES families, and thus to have a positive impact on social mobility, as pupils' future success is determined less by family backgrounds, and more so by their own talents and efforts (Randall 2009). However, this is based on the premise that a considerable group of disadvantaged pupils is actually enrolled in grammar schools in the beginning.

While their selection is based on attainment, grammar schools are believed to be socially selective as well, as academic performance correlates with children's family backgrounds (Rasbash et al. 2010). The early-year performances of disadvantaged children might not reflect their true aptitudes due to insufficient family support. As a result, selection excludes certain groups of children who perform worse than they might have under different circumstances (McCulloch 2015), which clusters pupils with more advantaged backgrounds in grammar schools, while excluding the poor. This claim is supported by the underrepresentation of low SES pupils in grammar schools as well as by their lower rates of grammar school attendance (Atkinson, Gregg, and McConnell 2006; Levačić and Marsh 2007). The discrepancy among different pupil groups begins with pupils' aspiration to attend the test of selection (the 11+). For example, in Kent pupils eligible for FSM are less likely to attend the 11+. Even if they do so, the pass rate

for these pupils is 12%, compared to 30% for non-FSM pupils (Allen, Bartley, and Nye 2017). As a result, less than 3% of grammar school pupils are known to be eligible for FSM. By contrast, the national rate is 13.2%. Only 7% of grammar school pupils have been eligible for FSM at any point over the previous six years, while the national rate is 31% (Andrews, Hutchinson, and Johnes 2016; Nye 2016; Sibieta 2016). Furthermore, when considering prior attainment, the gap of grammar school opportunities persists (Harris and Rose 2013). For example, in 2011 only 40% of high-achieving FSM pupils entered grammar schools, while the proportion of non-FSM pupils was 60% in selective LAs (Cribb et al. 2014). In Kent, amongst pupils who had achieved Level 5 or above in English and maths in 2015, only 51.4% of FSM-eligible pupils attended grammar schools. Meanwhile, the rate for non-FSM pupils was 72.7% (Andrews, Hutchinson, and Johnes 2016). This is also the case with pupils who have special educational needs (SEN), who are less likely to attend grammar schools after taking attainment into consideration (Cribb et al. 2014). A similar discrepancy can be found among different ethnic groups (Bolton 2017). While Chinese and Indian pupils are overrepresented in grammar schools, black pupils are often underrepresented (Andrews, Hutchinson, and Johnes 2016). Therefore, who is accepted into grammar schools is a critical area of inquiry. It reveals how different pupil groups might benefit or be disadvantaged if the grammar school effect truly exists, providing implications for social mobility and educational equity. The answer also demonstrates whether the selection will have influence on social integration, as instead of giving every child the same chances, the separation of pupils with different abilities may lead to segregation and socially divisive results (Thomson, Sylvester, and Hurst 2016). While most of the previous research is conducted grouping all the LAs with grammar schools together or focusing on only one LA, this research presents the individual pattern of grammar school opportunities in

each LA systematically. Furthermore, besides the analysis of the unbalanced pattern of grammar school participation between different pupil groups, the underlying correlated factors are also examined to explore the possible reasons behind the difference in grammar school opportunities, shedding light on education equity, social mobility and integration.

**Methods**

All data used for analysis in this research were acquired through the National Pupil Database (NPD), which collects annual performance and background data of all the pupils in England. The 2010-2011 Key Stage 2 (KS2) pupil cohort in England was selected for analysis, so that this cohort had taken the 11+ test, and attended grammar school or not up to and beyond Key Stage 4 (KS4). The total analysis consists of 612,027 pupils, including 186,461 in 36 LAs with grammar schools. The analysis first shows how the difficulty of grammar school entrance varies across LAs by comparing the expected performance of prospective grammar school pupils at KS2 in each LA. This includes 160,070 valid cases and excludes 26,391 (14%) cases with missing KS2 attainment data. Lacking the 11+ data, the KS2 performance indicator used in this stage is pupils' English and maths results from the KS2 national test, with a total mark of 200 (100 in each subject). Pupils' KS2 science results are excluded not only because they are based on teacher assessment (which is less consistent across schools and LAs), but also because the 11+ usually includes English, verbal reasoning, numerical reasoning and non-verbal reasoning, the contents of which have more direct links with English and maths than with science.

After revealing the difference in selection requirement across LAs, the analysis focuses on pupils whose home LAs are different from the LAs of their secondary

schools. Their proportion in grammar schools and the probability of attending grammar schools are compared with their counterparts who stayed within home LAs for secondary education. The following step analyses the probability of school entry for three minority groups: FSM eligible pupils, pupils with SEN school action plus or statement (SEN-PS) and pupils who speak English as an additional language (EAL) in each LA. While the SEN School Action Plus code has been replaced by SEN Support, and SEN Statement has been replaced by Education, Health and Care Plans from September 2014 (DfE and Department of Health 2015), the SEN code for this cohort still uses the older version. The analysis includes 168,023 valid cases with FSM data (18,438 missing), 186,461 with SEN data (no missing data) and 168,023 with EAL data (18,438 missing) in all 36 LAs. Next, KS2 attainment is taken into consideration and only *high performers* in each LA are selected. Again, because of the current lack of the 11+ data, the standard of *high performer* is set as pupils in each LA whose KS2 mark was higher than the lowest KS2 mark for grammar school pupils. This distinguishes potential grammar school candidates from the entire year group, as pupils who achieve this mark may attend grammar schools while those who do not are given no opportunity in their LAs. Based on this standard, the analysis entails 103,558 valid cases with KS2 attainment data, and deletes 42 with missing FSM and EAL data in all 36 LAs. Instead of comparing the probability of minority groups attending grammar schools with all their peers in the same year group, only high performers in each LA are included for comparison in this step.

In addition to the snapshots of the probability of attending grammar schools, logistic regression is used to explore to what extent grammar school opportunities can be explained more systematically by pupils' backgrounds and their attainment. Logistic regression predicts the probabilities of the binary outcome, and provides the relative

odds (probability of getting into a grammar school / probability of not getting into a grammar school). The outcome of most interest is Exp (B), which compares the odds of getting into grammar schools for one group of pupils with the odds for another pupil group, producing an odds ratio. For categorical independent variables, Exp (B) presents the comparison of the odds for each subgroup with the reference category. For numerical variables, it shows the changes in odds ratios with a one unit increase in the independent variables. Only LAs which have more than 20% grammar school pupils are chosen since in these LAs, attending grammar schools is a more common option for their pupils, rather than a rare route for a tiny minority. This includes 12 LAs and 55,831 pupils in total. The first logistic model considers pupils' personal backgrounds. The analysis includes dummy variables for pupils staying within their LAs during secondary education contrasted against those who move outside; for FSM eligible pupils contrasted against non-FSM eligible pupils; for SEN pupils contrasted with pupils with no SEN; and for each ethnic group contrasted against the majority white group. The recoded birth month, *Month Age*, converts children's months of birth into ordinal numbers, with pupils born in August (the youngest) equalling 1 and those born in September (the eldest) equalling 12, thus taking the relative age within a year group into consideration. Model 2 uses a two-stage logistic regression, which enters personal background variables in the first stage (the same as Model 1), and enters KS2 prior attainment in the second stage.

## Findings

### *Description of 36 LAs with grammar schools*

In 2011, there were 163 grammar schools in England. They were located in 36 of the 152 LAs, and educated about 5% of English pupils. These 36 LAs present some

differences from the national picture, as can be seen in Table 1. Overall, these LAs are located in richer areas, as revealed by the Income Deprivation Affecting Child Index (IDACI), which is 0.22 compared with 0.24 in LAs without grammar schools. Meanwhile, there are lower proportions of disadvantaged pupils—such as those eligible for FSM and those who have SEN-PS, and higher proportions of native English speakers—in LAs with grammar schools. Furthermore, LAs with grammar schools have fewer children with missing data in the aforementioned aspects. These children are believed to be more difficult to reach and more disadvantaged if they are educated within the state system (Gorard and See 2013). This might be due to the fact that LAs with grammar schools have lower proportions of independent school pupils (6.7%) than do those without (8.8%), and that LAs with grammar schools have proportionally more trackable mainstream pupils than LAs without.

The proportions of grammar school pupils in these 36 LAs differ, ranging from 1.4% to 37.4%, with a mean of 13.8%. There are 18 LAs in which fewer than 10% of pupils attended grammar schools in 2011, including 10 LAs where attendance was lower than 5%. There are also 2 LAs that selected more than 30% of their pupils into grammar schools in 2011. This shows that pupils in different LAs have different likelihoods of having the opportunity to attend grammar schools, even despite other factors. As presented in Table 2, LAs with different proportions of grammar school pupils are dissimilar in terms of local family income, and proportions of FSM, SEN-PS and EAL pupils.

***Overall grammar school opportunities***

As mentioned in the previous section, pupils in LAs with varying proportions of grammar school places have differing grammar school opportunities. In LAs with small

proportions, high performance does not guarantee a successful path to grammar school. Even the top-performing pupil may not have the opportunity to attend grammar school due to limits imposed by the overall proportion of grammar school places.

In order to elucidate the difficulty of being accepted into grammar schools in each LA, the lowest KS2 marks for grammar school pupils are compared as presented in Figure 2 (sorted from left to right in ascending order of the proportion of grammar school places). This variable has wide variance, with the individual number ranging from 67 to 145, and reaching an average of 115. Therefore, pupils in certain LAs need to achieve more than twice the KS2 marks of those in other LAs to have any possibility of being admitted into a grammar school. In 2011, the national average total KS2 mark for English and maths was 126, with a bottom quartile mark of 103, and the highest quartile was 153. Contrasted with this national performance level, among these 36 LAs, there are 10 LAs that did not admit any pupil with below-average KS2 results. Meanwhile, 12 LAs admitted pupils in the bottom quartile of KS2 national performance into grammar schools.

As the grammar school opportunities among LAs are unbalanced, it is also within expectation that the average KS4 results of grammar schools in each LA differ. As presented in Figure 3, the NPD point score for total GCSE (and equivalent) shows that the KS4 average result of grammar schools ranges from 62.98 to 92.10 among 36 LAs; the range for Best 8 GCSE (and equivalent) is from 50.63 to 61.35. However, a higher likelihood of attending grammar schools at the local level does not necessarily lead to lower KS4 results for the average performance of grammar schools. The correlation between the proportion of grammar school pupils and total GCSE of grammar schools for each LA is only -0.29, and the rate is even lower for Best 8 result (-0.28). Meanwhile, the correlations between the lowest KS2 marks for grammar school

pupils and KS4 results for grammar schools for each LA are weak—0.52 for total GCSE and 0.65 for Best 8 results.

***Grammar school opportunities for pupils moving across LAs***

As revealed by the KS2 marks of grammar school pupils, the difficulty of being accepted into grammar schools varies across LAs, depending on the provision of available school places, rather than a certain threshold of academic performance. Therefore, the prospect of attending grammar schools diverges when looking solely at where children live and where they apply for grammar schools. Therefore, changing the location of grammar school applications might influence grammar school opportunities for individual pupils.

This is confirmed by the pattern of grammar school entrance among pupils crossing LA boundaries. For all pupils attending secondary schools in LAs with grammar schools, 16,936 moved across LAs, accounting for 9% of the overall 186,461. Among these 36 LAs with grammar schools, 25.3% of the pupils who attended grammar schools lived outside the LA. This is more than twice the amount than that of other state schools (9.1%). Additionally, pupils moving across LAs are twice more likely to attend grammar schools than are those who stay within the home LA for secondary education. In order to see whether the difference is purely due to performance, the two groups' KS2 marks were compared. Based on the differentiated pattern of participation, it is not surprising that pupils who move outside the home LA have a higher average KS2 mark than those who stay within (142 vs. 126). However, when the probability of attending grammar schools for each KS2 mark is compared between the two groups, the higher average performance of pupils moving outside the LA can no longer explain their higher grammar school opportunities. As can be seen

from Figure 1, pupils with low attainment (usually below 120) are not considered potential candidates for grammar schools in either case. The pattern of pupils at the right end is instable, with large fluctuations, because there are very few cases in each KS2 mark above the point of 190. In all the other performance levels, pupils living outside the LA have more grammar school opportunities. The cleavage between the two groups is substantial, especially for pupils scoring between 150 and 190. Within this range, the pupils who have moved have in excess of 20-30% higher probability of attending grammar schools than do their counterparts. This is the range into which more than 80% of grammar school pupils fall.

Since the clustered pattern of pupils crossing the LA boundary in grammar schools and the noticeably higher probability of being accepted to grammar schools can hardly be explained by their performance, the characteristics of this group are examined. After making the comparison, it can be seen that pupils moving outside the home LAs demonstrate systematic differences from those staying within (Table 3). The former usually come from slightly richer areas, as is revealed by the average IDACI (0.217 vs 0.221), and have many fewer FSM eligible and SEN-PS pupils. In terms of ethnicity, the relocated group has proportionately fewer white pupils. Meanwhile, this group has more Asian and black pupils. While the extra 3.1% Asian pupils in the relocated group constitutes only a moderately higher proportion than that of the non-relocated group, the 3.9% higher proportion of black pupils means that they are proportionately twice as clustered in the relocated group than the non-relocated group. Although there are more ethnic minorities in the relocated group, the overall comparison of the characteristics demonstrates that pupils who move outside the home LA for secondary education are usually more advantaged than those who stay within.

In order to check whether it is a general pattern that LAs both with and without grammar schools exhibit different patterns of pupils moving outside the home LA for secondary education, the characteristics of pupils in non-selective LAs are examined. The overall proportion of relocated pupils in LAs without grammar schools is smaller, 8.4%. When the characteristics of relocated and non-relocated groups in non-selective LAs are compared, the result shows little difference (Table 3). The proportions of FSM pupils and SEN-PS pupils were similar for those who had moved across LAs and those who had not—the difference was less than 1%. The IDACI scores for the two groups are also the same. There are more ethnic minorities in the relocated group proportionately, similar to the pattern in LAs with grammar schools. Black pupils are still about twice as clustered in the relocated group, with a 5.8% higher proportion than their counterparts. However, Asian pupils are no longer overrepresented in the relocated group. Although there is still a four-mark KS2 performance advantage in the relocated group, this comparison indicates the compatible SES and academic performance of pupils in the two groups in non-grammar school LAs. Therefore, the advantaged background of pupils who move across LAs for secondary school is not a national pattern. It only exists in LAs with grammar schools. This comparison shows that the imbalanced opportunities for grammar school entry among LAs, combined with the freedom to move across LAs for grammar school places, has resulted in different access levels for pupils from different backgrounds. This has systematically benefited a group of more advantaged pupils.

***Grammar school opportunities for FSM, SEN-PS and EAL pupils***

In this section, three minority groups are examined: pupils known to be eligible for FSM, pupils who have SEN-PS, and EAL pupils. On average, grammar schools enrol

fewer FSM and SEN-PS pupils than do the 36 LAs with grammar schools as a whole. Furthermore, pupils from these two groups have a lower probability of attending grammar schools: 2.4% for the FSM group and 1.5% for the SEN-PS group. Meanwhile, the average probability for all pupils within these LAs is 12.1%. Unlike these two groups, EAL pupils are overrepresented in grammar schools, with a proportion of 17.6% compared with the average of 12.9% within these 36 LAs. Similarly, the likelihood of members of this group attending grammar school are 3% higher than that of their peers within the same year group (14.9% and 12.1% respectively). However, based on the varied pupil characteristics within the EAL group, this overall pattern does not necessarily mean that each minority ethnicity has an above-average opportunity to attend grammar schools. A more detailed in-group analysis will be conducted in a later section.

The overall trend is then confirmed by the following table which elucidates the systematic difference in the probability of attending grammar schools between three minority groups and all pupils in each LA. In Table 4, all 36 LAs are sorted in ascending order according to their proportions of grammar school pupils, with the first LA containing the smallest proportion. The ratio difference of the probability between minority groups and all pupils in each LA is calculated (Ratio difference = Probability for each subgroup / Probability for all pupils).

For FSM and SEN-PS pupils, there is no exception to them having a lower probability of attending grammar schools than their peers in each LA. As the total proportion of grammar school pupils grows, the proportion of FSM and SEN-PS pupils also grows within the LA, yet the gaps remain obvious. The ratio difference between FSM and all pupils is smaller than 0.4 in all 36 LAs. For SEN-PS pupils, their chances are even smaller than for the FSM group, and in six LAs there are no SEN-PS pupils in

grammar schools. Unlike FSM and SEN-PS pupils, with the patterns being consistent among LAs, the EAL group demonstrates a more complicated pattern. In most LAs, EAL pupils have a higher likelihood of attending grammar schools than do average pupils overall. Exceptions exist in eight LAs, where the EAL group has a lower probability, but only slightly. Therefore, despite the diverging patterns among LAs, the EAL group is still more advantaged overall. But unlike the dramatic under-representation of the FSM and the SEN-PS group, the advantage of the EAL group is miniscule.

***Grammar school opportunities for high performing FSM, SEN-PS and EAL pupils***

As grammar schools select their pupils based on attainment, which is correlated with pupil backgrounds, it might not be surprising that there are fewer disadvantaged pupils and more advantaged ones in grammar schools. However, if attainment is taken into consideration, are these three groups still disproportionately enrolled in grammar schools? To evaluate whether performance can explain the unbalanced patterns of participation, KS2 attainment is considered. The difference in the probability of high performing minority groups and all high performing pupils attending grammar schools in each LA is calculated (ratio difference = Probability for high performers in each subgroup / Probability for all high performers).

Overall, as can be seen in Table 5, FSM and SEN-PS pupils still are less likely to attend grammar schools, but the gap is lower than that of Table 4. The rate for FSM high performers is less than half the rate for all high performers in 33 LAs, with the smallest rate being 0.09. For SEN-PS high performers, although they were also underrepresented, the gap is smaller than that of the FSM group. This is despite the fact that there are six LAs where no SEN-PS pupils attended grammar school in 2011.

Alongside these 36 LAs, there are 18 LAs where SEN-PS high performers had less than half the likelihood of attending grammar schools as do all high performers, the least likely being Gloucestershire at 0.11. Exceptions can be found in Wolverhampton and North Yorkshire, where the SEN-PS group has slightly higher grammar school opportunities, after accounting for prior attainment. Therefore, although in the previous section, SEN-PS pupils only have half the likelihood of attending grammar school as do those of the FSM group, their opportunities are higher than those of the FSM group when attainment is included.

For EAL high performers, there is still a greater likelihood of attending grammar school in most LAs. The gap is slightly larger than that of when attainment is not considered (Table 4). Furthermore, the number of LAs presenting a contradictory pattern also decreases from 8 to 5, with 31 LAs each presenting the same trend—the EAL group having a higher probability than all high performers. It seems that speaking a first language other than English is not a barrier for pupils in terms of academic performance during early-years education. On the contrary, EAL pupils enjoy more opportunities for grammar school education than do native pupils, regardless of whether attainment is taken into consideration.

### *The relationship between pupil backgrounds, attainment and grammar school opportunities*

In this section, all background variables which are believed to be related to grammar school opportunities are evaluated together using logistic regression. The relationship between pupils' personal backgrounds, attainment and grammar school opportunities is thus elucidated more systematically. The results are presented in Table 6. As mentioned in the methods section, the most important outcome indicator is the Exp (B) in the right

column of each model, which provides the odds ratio of the probability of getting into grammar schools.

According to Model 1, boys are slightly more likely to attend grammar schools. While the total population, the number of grammar school places and the number of single-sex grammar schools are all similar for the two genders, this might be due to the differing proportion of missing data in background variables, which is higher overall for girls in grammar schools, but higher for boys in the general population. Therefore, more girls in grammar schools are excluded in the analysis, but more boys in the base population are deleted, leading to a spurious "bonus" for boys in the final result of Model 1. Meanwhile, older pupils within the year group have an advantage, as has been revealed in previous research (e.g. Crawford, Deaden, and Greaves 2013). Children from poorer families are less likely to attend grammar schools, and the same trend also applies to FSM eligible pupils and SEN pupils, confirming the conclusions of previous sections. For pupils from different ethnic groups, Chinese pupils are about 7 times as likely as white pupils to attend grammar schools. Unlike the national pattern revealed by Andrews, Hutchinson and Johnes (2016) that black pupils are believed to be the most disadvantaged, this research shows that white pupils are the least likely to attend grammar schools when other personal variables are equal to those of other ethnic groups in these 12 LAs. Furthermore, children staying in their own LAs for secondary schooling only have 28% of the chance of those who move outside. Despite these differences, inputting these personal variables into Model 1 only increases the accuracy of prediction by 3.4% over the null model which includes no explanatory variables. This reveals that personal backgrounds account for a small proportion of the variation in the opportunity to attend grammar schools.

Based on Model 1, Model 2 adds KS2 attainment in the second stage. This leads to an additional 10.3% in predictive correctness, reaching a total increase of 13.7% over that of the null model. This reveals the importance of KS2 as it accounts for most of the variation in grammar school opportunities. Adding KS2 attainment into the model decreases the effect of moving outside the home LA, IDACI, FSM eligibility, ethnicity and most notably SEN in predicting the opportunity for grammar school participation. This underscores how considering attainment weakens the gaps between pupils with different backgrounds, especially for SEN pupils. Model 2 also presents a situation opposite that of Model 1 in which girls are more likely to attend grammar schools when attainment is controlled for. However, the odds ratio for gender is close to 1, revealing that the difference is small. Meanwhile, while older pupils are more advantaged in accessing grammar school places in Model 1, they are less likely to attend grammar schools once KS2 attainment variables are controlled for. As grammar school selection tests are usually standardised by age, this reflects the inadequate standardisation of the test results during the selection process. It also reflects the lack of age-standardisation in the KS2 results. Without considering age, the KS2 test is judging younger pupils to be less able than otherwise would be revealed by the 11+. Based on this, the eldest pupils within a year group have about 40% lower grammar school opportunities than do the youngest ones. Furthermore, the odds ratio for KS2 attainment reveals that maths attainment is more important in predicting grammar school opportunities than is English, as pupils with one grade higher in maths are about 16 times as likely to attend grammar schools, while pupils with equivalent advantages in English only have 5 times the difference.

In addition to the results of these two models, logistic regression including Key Stage 1 (KS1) point scores was also run. The results show that when controlling for

pupil backgrounds and KS1 attainment, pupils with better KS1 results have more grammar school opportunities. Furthermore, KS1 English performance (Exp (B) = 1.33) is slightly more important than maths (Exp (B) = 1.28) for prediction. However, when KS2 attainment is controlled for, KS1 attainment no longer plays an important role in predicting grammar school opportunities— adding KS1 into Model 2 only brings an additional 0.1% increase in percentage correctness, and the Exp (B) for KS1 English and maths drops to 1.14 and 1.01, respectively. Therefore, for the purposes of simplicity, the detailed results of the models including KS1 attainment are not presented.

Besides the correlation between attainments in different key stages, it should also be noted that personal backgrounds are also related to attainment. In order to see to what extent the difference in results due to personal backgrounds overlaps with KS2 attainment, a reversed two-stage logistic regression is applied. KS2 attainment is put into the model first and then personal backgrounds—this is opposite the order of the biographical one in Model 2. The result of the reversed model shows that including KS2 attainment in the model constitutes 12.6% of the growth in predictive correctness, and leaves only 1.1% for personal backgrounds—smaller than the 3.4% demonstrated in Models 1 and Model 2. Looked at in this way, the influence of personal backgrounds in predicting grammar school opportunities is located between 1.1% to 3.4%. As most of the differences resulted from personal backgrounds overlap with KS2 attainment, the influence of personal backgrounds independent of attainment is negligible.

The analysis demonstrates that although variation among pupils from different backgrounds does exist, personal backgrounds do not play a major role in determining pupils' grammar school opportunities, regardless of whether or not attainment is considered. Therefore, during the grammar school selection process, attainment is still the most influential factor. Pupils with higher KS2 performance, especially those with

high maths performance, have the highest likelihood of attending grammar schools, other variables being equal.

## Conclusion

Analysis of KS2 results from the 2010-2011 cohort shows that the varied proportions of available grammar school places in each LA leads to an imbalance in opportunities for pupils wishing to attend grammar schools. Due to this, the threshold of grammar school selection across LAs is variegated. Some LAs surprisingly allow pupils from the bottom national quartile for KS2 performance to attend grammar schools; others only enrol pupils with above-average performance, leading to dissimilar student compositions across grammar schools. This questions the appropriateness of treating all grammar schools as a single entity in analysis, and thus masking the internal differences within. The heterogeneity of grammar schools not only influences school characteristics and pupil intake, but it may also affect school effectiveness in general. In this study, the direct examination on the correlation between the lowest KS2 mark of grammar school pupils and KS4 result of grammar schools in each LA leads to no firm conclusion on grammar school effectiveness because it does not account for pupil and school level characteristics. However, these findings partly overlap with Coe et al.'s (2008) conclusion that there is no obvious relationship between the degree of LA selectivity and the effectiveness of grammar schools. More in-depth research focusing on the trade-off between the selectivity and effectiveness of grammar schools, as well as a focus on individual grammar schools, is needed to transcend research on examinations at the LA level.

The inequality of opportunity among LAs means that sending a child to another LA will have a major influence on his/her chance of getting into a grammar school.

However, according to the dissimilar characteristics between pupils who move to another LA for grammar school places and those who do not, moving across LAs has become a shortcut for more affluent families to manoeuvre within the selective system, as it is not usually an option for less advantaged ones. Although for pupils living near the border of a LA, schools in their own LAs are not necessarily geographically closer than those in a nearby LA, for most pupils from less supportive families, the extra time and devotion to access application information (in addition to the cost of attending schools far away) can present obstacles. While it has been frequently mentioned that coaching has given more affluent pupils an unfair advantage in grammar school selection, the result of this study reveals that a simpler but effective action for the rich would be to let their children sit the 11+ in other LAs with more grammar school opportunities.

Besides the geographical difference, the divergent opportunities for pupils with other different characteristics are also considerable. For pupils with equivalent prior attainment, pupils from ethnic minority groups usually have more opportunities than white pupils, but pupils from poorer areas, eligible for FSM and those who have SEN usually have lower opportunities to attend grammar schools. The unequal success rates between summer-born and autumn-born pupils also calls for more adequate age-standardised selection tests. However, although the gap between different pupil groups exists, the results show that during the process of grammar school selection, attainment is more important than personal backgrounds. Therefore, the inequality of opportunity to attend grammar schools for pupils from different backgrounds is likely not due to a deliberately biased selection process that favours certain groups of pupils. Rather, it is probably the result of diverging attainment among pupil groups at the end of primary education. While this outcome demonstrates the (relatively) equitable process of

grammar school enrolment based on their selection criteria, there is also no evidence that grammar schools can help the poor, as their likelihood of attending grammar schools is limited. The status quo of the layered attainment means that if secondary schools are allowed to select based on attainment, they are thus selecting pupils from more advantaged backgrounds. This result reveals that the assumption that grammar schools promote social mobility is unsound. On the contrary, if grammar schools do perform better than other state schools, they will widen the gap between children from high and low SES groups by offering higher KS4 results for their pupils. Meanwhile, pupils with no sufficient family support, and thus performing worse than they would have otherwise at the age of 11, will lag further behind, as they will be enrolled into less effective secondary schools. Future research paying attention to the effect of grammar schools on higher education opportunities between different social groups can be conducted using the same cohort, as the data of higher education participation will be available soon. Furthermore, whether or not grammar schools are more effective, the action of separating pupils based on their attainment (and social status indirectly) will lead to issues of segregation and clustering on a local level based on the differentiated grammar school opportunities among pupil groups. It has been noted that these 36 LAs with grammar schools are the most segregated areas in England based on SES. Furthermore, the segregation residual of FSM eligibility is 10 times larger in grammar schools than it is for the general population (Gorard and See 2013; Gorard, Taylor, and Fitz 2003). The benefit of being educated in schools with greater social mix has long been emphasised (Morris and Perry 2017; Marten 2015), and the early separation of pupils into different routes is believed to have a negative influence on pupils' civic awareness, tolerance of others, and sense of justice and fairness. This will ultimately endanger the integration of society as a whole (Gorard 2008; Gorard and Smith 2010).

Actions have been taken to address the existing critiques of the limited grammar school opportunities for disadvantaged pupils. These include using a quota system to enrol a certain proportion of pupils eligible for FSM or Pupil Premiums (e.g. 20-25% in Birmingham from 2015) and targeting primary schools with high proportions of FSM pupils (Marten 2015). While more systematic evaluation on the attempts to prioritise FSM pupils is needed, existing research has found no evidence that the quota system is helpful (Allen 2016). These actions also raise follow-up concerns such as the fit-in problem of this small group of academically and socially less advantaged pupils in grammar schools, the diminished effectiveness of grammar schools, and the political and practical challenge of defining pupils who should be given "extra" opportunities. While these policy reactions are direct and oversimplistic attempts to balance grammar school intake (which itself is hardly justified based on this study's findings that the assumption behind the grammar school policy is invalid), the broader social inequality that widens the attainment gap between groups from an early age is a more pressing issue. Instead of placing a handful of underrepresented pupils into grammar schools, the solution should involve structural change to ameliorate the overall underachievement of certain groups, beginning at an early-age. As the difference exists before grammar school selection, more attention should be given to the primary school stage or even the preschool age, such as early-childhood education and care (Breen and Jonsson 2005).

The findings from this study could provide implications for partially selective schools in England and other countries where early selection exists. Similar research could also be conducted in countries with academically selective schools to test whether these selection patterns are globally consistent. This research may be more fruitful in countries where both the selection test and the test at the end of secondary school are publicly available. For this research, which has been limited by the data available, the

KS2 national assessment was used as the indicator of pupil performance. However, the extent to which the KS2 marks can predict the results of grammar school selection tests, has yet to be sufficiently examined. Future research utilising the results of the 11+ test should be conducted to form a clearer picture, once access to data is granted.

**Acknowledgements**

I would like to thank Professor Stephen Gorard for his expert advice and support.

**Disclosure statement**

No potential conflict of interest was reported by the author.

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| | IDACI Mean (Missing data) | FSM proportion (Missing data) | SEN-PS Proportion (Missing data) | EAL Proportion (Missing data) |
|---|---|---|---|---|
| LAs with GS | 0.22 (11.9%) | 15.0% (9.9%) | 9.7% (11.6%) | 12.9% (9.9%) |
| LAs without GS | 0.24 (13.0%) | 16.5% (11.4%) | 10.0% (12.7%) | 13.4% (11.4%) |

Table 1: Characteristics of LAs with and without grammar schools (GS)

| | Number of LA | IDACI mean | FSM proportion | SEN-PS proportion | EAL proportion |
|---|---|---|---|---|---|
| LAs with lower than 10% GS students | 18 | 0.24 | 16.8% | 9.7% | 15.1% |
| LAs with 10-20% GS students | 6 | 0.19 | 12.3% | 7.9% | 9.2% |
| LAs with 20-30% GS students | 10 | 0.20 | 13.5% | 10.8% | 9.1% |
| LAs with 30-40% GS students | 2 | 0.15 | 7.3% | 8.1% | 13.2% |

Table 2: Characteristics of LAs with grammar schools

| | Probability of entering GS | KS2 mark | IDACI | FSM | SEN-PS | White pupils | Asia pupils | Black pupils |
|---|---|---|---|---|---|---|---|---|
| *LAs with GS* | | | | | | | | |
| Moving across LAs | 33.7% | 142 | 0.217 | 11.9% | 7.7% | 63.4% | 11.9% | 7.2% |
| Staying within home LAs | 11.0% | 126 | 0.221 | 17.1% | 10.8% | 76.4% | 8.8% | 3.2% |
| | | | | | | | | |
| *LAs without GS* | | | | | | | | |
| Moving across LAs | - | 128 | 0.200 | 17.0% | 10.0% | 67.9% | 8.9% | 10.9% |
| Staying within home LAs | - | 124 | 0.200 | 17.8% | 10.7% | 79.1% | 9.2% | 5.1% |

Table 3: Characteristics of pupils moving across LAs and staying within home LAs

| | LA of secondary school (Proportion of GS pupils%) | Probability for FSM / Probability for all pupils | Probability for SEN-PS / Probability for all pupils | Probability for EAL / Probability for all pupils |
|---|---|---|---|---|
| 1 | Devon (1.4) | 0.07 | No SEN-PS in GS | 2.57 |
| 2 | Cumbria (2.2) | 0.09 | 0.09 | 1.59 |
| 3 | Liverpool (2.4) | 0.08 | No SEN-PS in GS | 2.33 |
| 4 | Essex (2.8) | 0.14 | 0.04 | 3.71 |
| 5 | Kirklees (3.3) | 0.18 | 0.15 | 1.48 |
| 6 | Wolverhampton (3.9) | 0.13 | 0.10 | 1.41 |
| 7 | Lancashire (4.0) | 0.10 | 0.15 | 0.85 |
| 8 | Wiltshire (4.1) | 0.05 | No SEN-PS in GS | 0.63 |
| 9 | Enfield (4.8) | 0.21 | 0.15 | 1.00 |
| 10 | North Yorkshire (4.9) | 0.20 | 0.31 | 2.86 |
| 11 | Stoke-on-Trent (5.0) | 0.10 | 0.20 | 0.60 |
| 12 | Walsall (5.3) | 0.21 | 0.15 | 1.94 |
| 13 | Redbridge (6.4) | 0.31 | No SEN-PS in GS | 1.44 |
| 14 | Bromley (6.7) | 0.10 | 0.13 | 2.03 |
| 15 | Birmingham (7.3) | 0.23 | 0.07 | 0.82 |
| 16 | Warwickshire (7.3) | 0.08 | 0.07 | 1.19 |
| 17 | Telford and Wrekin (7.8) | 0.09 | No SEN-PS in GS | 1.28 |
| 18 | Barnet (8.4) | 0.13 | 0.19 | 1.45 |
| 19 | Calderdale (11.4) | 0.25 | 0.16 | 0.80 |
| 20 | Gloucestershire (11.4) | 0.20 | 0.05 | 2.24 |
| 21 | Reading (14) | 0.10 | 0.19 | 1.59 |
| 22 | Kingston upon Thames (14.2) | 0.20 | 0.04 | 1.92 |
| 23 | Plymouth (14.4) | 0.29 | 0.04 | 1.61 |
| 24 | Bournemouth (17.1) | 0.12 | No SEN-PS in GS | 0.85 |
| 25 | Poole (20.8) | 0.10 | 0.10 | 0.82 |
| 26 | Bexley (22.7) | 0.37 | 0.21 | 1.39 |
| 27 | Lincolnshire (22.7) | 0.26 | 0.15 | 0.84 |
| 28 | Torbay (24.9) | 0.24 | 0.11 | 1.10 |
| 29 | Wirral (25.8) | 0.20 | 0.04 | 1.28 |
| 30 | Medway (25.9) | 0.33 | 0.22 | 1.33 |
| 31 | Sutton (26.3) | 0.35 | 0.08 | 1.96 |
| 32 | Kent (26.3) | 0.24 | 0.16 | 1.51 |
| 33 | Southend-on-Sea (26.9) | 0.15 | 0.07 | 1.50 |
| 34 | Slough (29.9) | 0.30 | 0.10 | 1.13 |
| 35 | Buckinghamshire (34.9) | 0.21 | 0.11 | 1.14 |
| 36 | Trafford (37.4) | 0.20 | 0.05 | 1.25 |

Table 4: Ratio difference of probabilities of going to grammar schools (GS) between FSM, SEN-PS, EAL students and all students in each LA

| | LA of secondary school | Probability for FSM / Probability for all pupils (high performer) | Probability for SEN-PS / Probability for all pupils (high performer) | Probability for EAL / Probability for all pupils (high performer) |
|---|---|---|---|---|
| 1 | Devon | 0.18 | No SEN-PS in GS | 3.25 |
| 2 | Cumbria | 0.16 | 0.19 | 1.88 |
| 3 | Liverpool | 0.09 | No SEN-PS in GS | 2.41 |
| 4 | Essex | 0.34 | 0.29 | 3.92 |
| 5 | Kirklees | 0.32 | 0.96 | 1.64 |
| 6 | Wolverhampton | 0.25 | 1.25 | 1.40 |
| 7 | Lancashire | 0.16 | 0.51 | 1.05 |
| 8 | Wiltshire | 0.18 | No SEN-PS in GS | 0.77 |
| 9 | Enfield | 0.35 | 0.55 | 1.10 |
| 10 | North Yorkshire | 0.29 | 1.16 | 2.79 |
| 11 | Stoke-on-Trent | 0.13 | 0.61 | 0.66 |
| 12 | Walsall | 0.28 | 0.54 | 2.16 |
| 13 | Redbridge | 0.36 | No SEN-PS in GS | 1.34 |
| 14 | Bromley | 0.19 | 0.65 | 2.06 |
| 15 | Birmingham | 0.31 | 0.37 | 0.85 |
| 16 | Warwickshire | 0.13 | 0.28 | 1.27 |
| 17 | Telford and Wrekin | 0.17 | No SEN-PS in GS | 2.41 |
| 18 | Barnet | 0.17 | 0.53 | 1.37 |
| 19 | Calderdale | 0.41 | 0.49 | 1.12 |
| 20 | Gloucestershire | 0.27 | 0.11 | 2.18 |
| 21 | Reading | 0.23 | 0.79 | 1.61 |
| 22 | Kingston upon Thames | 0.34 | 0.23 | 1.79 |
| 23 | Plymouth | 0.43 | 0.13 | 1.61 |
| 24 | Bournemouth | 0.22 | No SEN-PS in GS | 1.11 |
| 25 | Poole | 0.15 | 0.37 | 0.74 |
| 26 | Bexley | 0.56 | 0.66 | 1.31 |
| 27 | Lincolnshire | 0.30 | 0.27 | 0.98 |
| 28 | Torbay | 0.50 | 0.52 | 1.51 |
| 29 | Wirral | 0.26 | 0.15 | 1.51 |
| 30 | Medway | 0.42 | 0.43 | 1.30 |
| 31 | Sutton | 0.51 | 0.31 | 1.77 |
| 32 | Kent | 0.32 | 0.37 | 1.50 |
| 33 | Southend-on-Sea | 0.28 | 0.49 | 1.51 |
| 34 | Slough | 0.36 | 0.27 | 1.08 |
| 35 | Buckinghamshire | 0.29 | 0.30 | 1.24 |
| 36 | Trafford | 0.26 | 0.13 | 1.29 |

Table 5: Ratio difference of probabilities of going to grammar schools between FSM, SEN-PS, EAL high performers and all high performers in each LA

| | Model 1 | | Model 2 | |
|---|---|---|---|---|
| **Variable** | B | Exp (B) | B | Exp (B) |
| *(First Stage)* | | | | |
| Girl vs. Boy | -0.10 | 0.91 | 0.06 | 1.06 |
| | | | | |
| Month Age | 0.02 | 1.02 | -0.04 | 0.96 |
| | | | | |
| Staying within Home LA | -1.27 | 0.28 | -0.72 | 0.49 |
| IDACI | -3.67 | 0.03 | -3.07 | 0.05 |
| FSM Eligible | -1.17 | 0.31 | -0.76 | 0.47 |
| SEN School Action | -2.30 | 0.10 | -0.53 | 0.59 |
| SEN School Action Plus | -2.27 | 0.10 | -0.47 | 0.63 |
| SEN Statement | -2.90 | 0.06 | -0.72 | 0.49 |
| | | | | |
| Asian | 1.16 | 3.20 | 1.14 | 3.12 |
| Black | 0.60 | 1.82 | 0.59 | 1.81 |
| Chinese | 2.00 | 7.39 | 1.40 | 4.07 |
| Mixed | 0.36 | 1.44 | 0.24 | 1.27 |
| Unclassified | 0.30 | 1.36 | 0.21 | 1.24 |
| Other Ethnic Groups | 0.83 | 2.29 | 0.65 | 1.91 |
| | | | | |
| *(Second Stage)* | | | | |
| KS2 Math Fine Grade | - | - | 2.77 | 15.89 |
| KS2 English Fine Grade | - | - | 1.67 | 5.34 |
| | | | | |
| No. of Observation | 45048/55831 | | 45048/55831 | |
| Percentage Correctness | Increase 3.4% From 72.2% to 75.6% | | Increase 13.7% From 72.2% to 85.9% | |

Table 6: Logistic regression of grammar school opportunities

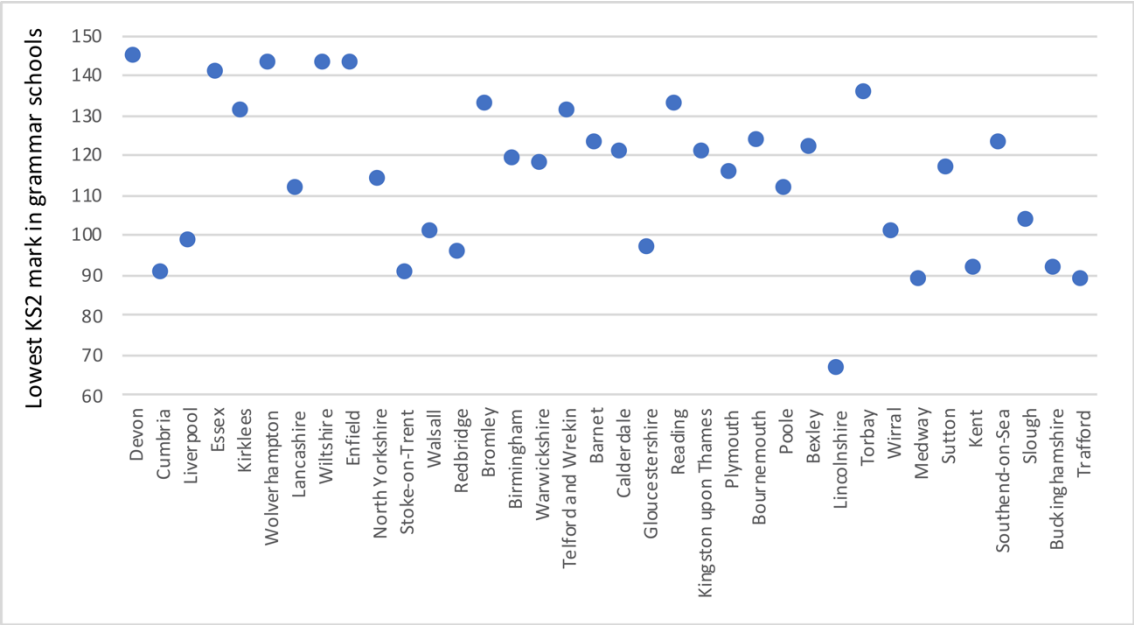


Figure 1. Lowest KS2 mark for grammar school pupils in each LA

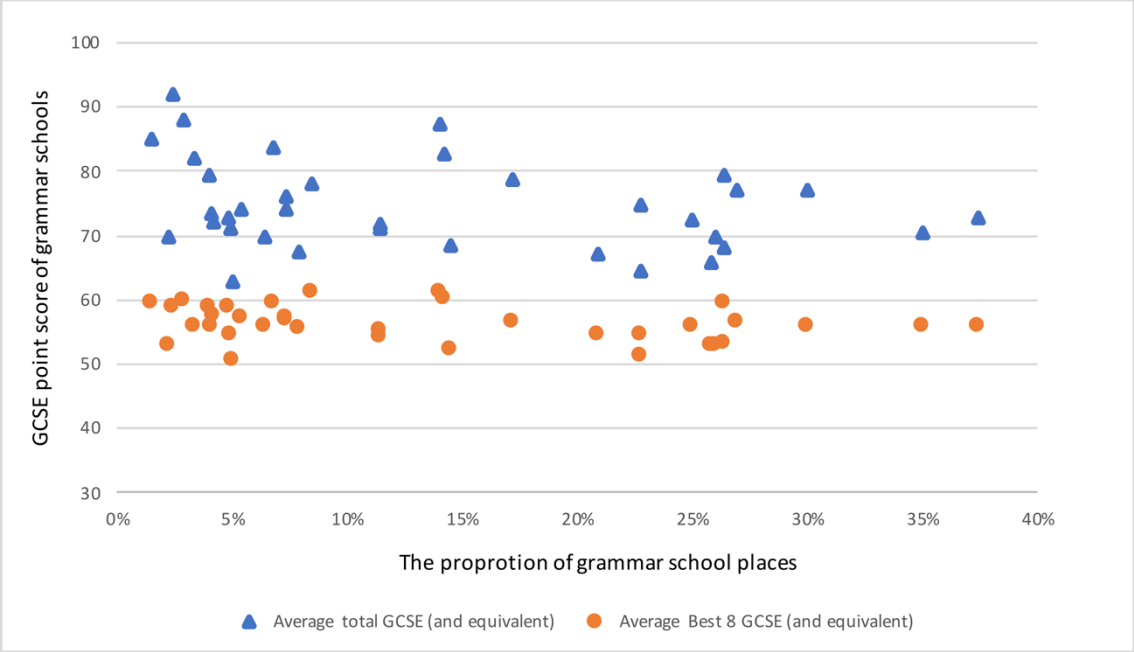


Figure 2. GCSE performance of grammar schools and the proportion of grammar school places in each LA

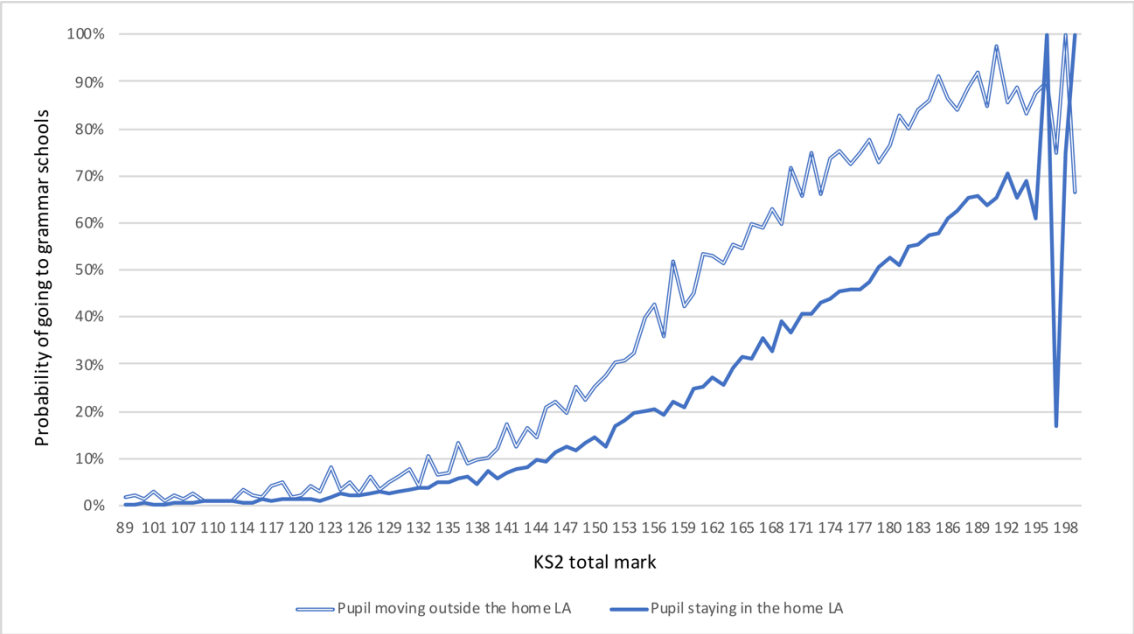


Figure 3. KS2 mark and the probability of going to grammar schools.